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A NEW GENUS AND SPECIES OF RIFFLE BEETLE, *NEBLINAGENA PRIMA*, FROM THE VENEZUELAN TEPUI, CERRO DE LA NEBLINA (COLEOPTERA, ELMIDAE, LARINAE)

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Abstract.—A new genus and species of aquatic beetle, ***Neblinagena prima***, is described, illustrated by scanning electron micrographs and pen and ink drawings, and is distinguished from other larine genera by interpolation in the most recent key to the larine genera of elmid beetles. The specimens were collected from an area of suspected high endemicity, the tepui Cerro de la Neblina, in southern Venezuela.

The new genus described below was collected from Cerro de la Neblina, the "Mountain of the Mists" in southeastern Venezuela at the Brazilian border. Cerro de la Neblina, a 647 square kilometers sheer-sided sandstone mesa (tepui; highest peak, about 3045 meters) is one of numerous high, table-top mountains that occur in northern South America. The mesas are the eroded remains of a former large plateau, the Guiana Highland Shield, which probably dates from hundreds of millions of years ago at the time South America and Africa formed a single huge continent. The mesas rise sharply from the tropical rain forests and their tops are often obscured by a dense cloud cover. Consequently, climatic conditions on the tops of the mesas are harsh, with wide temperature fluctuations occurring between day and night. There are frequent torrential rains. The few mesas that have been visited were explored by botanists who found a high rate of endemic plants on those ancient remnants. Botanists have estimated that 98% of the plants on Cerro de la Neblina are species new to science. The animals on the mesas have been less well collected but those that have been obtained and studied suggest that many also are endemic forms. Whether the new genus *Neblinagena* (collected at altitudes ranging from 770 to 2100 meters) is endemic to Cerro de la Neblina is a question that probably will not be answered until much more fieldwork can be carried out in South America.

The specimens of this new genus and species were collected during a biological survey of Cerro de la Neblina. The expedition to Cerro de la Neblina Park was organized and directed by the Foundation for the Development of Physics, Mathematics, and Natural Sciences of Venezuela, with the patronage of the Ministry of Education, National Council of Scientific and Technological Research, and National Institute of Parks (all are Venezuelan institutions) and was coordinated by Dr. Charles Brewer-Carias. The expedition was conducted in collaboration

with the National Science Foundation of the United States, the American Museum of Natural History, the Field Museum of Natural History, the Missouri Botanical Garden, the New York Botanical Garden, and the Smithsonian Institution; biologists from several universities and other institutions have also participated.

Neblinagena, New Genus

Body elongate, subparallel, and moderately convex (Figs. 1, 2). Integument clothed for the most part with dense, moderately long, usually recumbent hydrofuge pubescence.

Head partly retracted into pronotum but not beyond the basal portion of the submentum. Mouthparts visible. Maxillary palpus, 4 segmented. Labial palpus, 3 segmented. Antenna, 11 segmented. Clypeus transversely subrectangular; clypeal suture raised, ridgelike between bases of antennae; anterolateral angles broadly rounded. Labrum transversely rectangular; anterior margin moderately emarginate at middle; anterolateral angles broadly rounded.

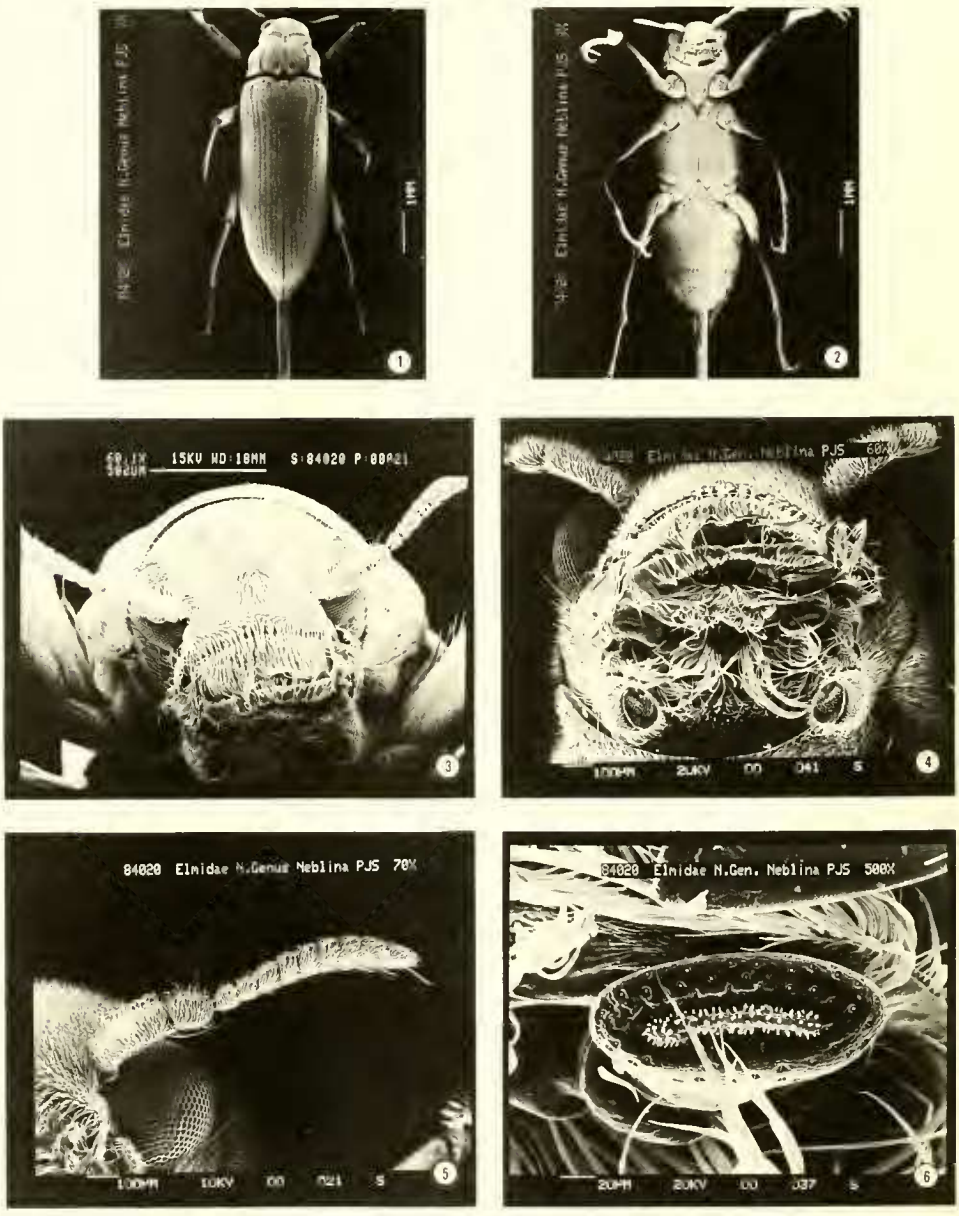
Pronotum widest at base then sinuately narrowing anteriorly, becoming evenly arcuate over head; base trisinuate, broadly sinuate on each side and much more narrowly so in front of scutellum; posterolateral angles acute and broadly depressed; middle of base with 2 short prescutellar carinae, each carina with distinct lateral depression. Pronotum with Y-shaped discal groove; lateral branches shallowly, broadly depressed, short, not confluent with sublateral arcuate-sinuate groove; stem of Y-shaped groove moderately deep; sublateral carina short, evident at base then merging with sublateral arcuate-sinuate groove. Scutellum flat, obovate. Elytron with 10 rows of punctures; without accessory row of punctures; without carinae; apex slender and prolonged. Prosternum long in front of procoxae, about 4 times the length of third antennal segment; moderately reflexed along anterior margin. Prosternal process broadly triangular between procoxae; apex subacute. Mesosternum with a deep V-shaped depression on midline for the reception of apex of prosternal process. Metasternum with disc shallowly, broadly depressed on posterior two-thirds; with longitudinal groove on posterior two-thirds of midline. Legs with visible portion of procoxae transverse and trochantin visible. Claws without teeth.

Abdomen with 6 sterna visible. Sternum 1 with carina behind each metacoxa extending to hind margin of sternum.

Type species of the genus.—*Neblinagena prima*, new species.

Etymology.—*Neblinagena* from Cerro de la Neblina, the name of the type-locality which means mountain of the mists; plus gena, L. = born in or living in, in reference to its relationship to its habitat. The gender is feminine.

Comparative notes.—Although this new genus keys to *Phanocerus* in Brown's (1981) key to the world genera of the elmid subfamily Larinae, its morphological affinities are with the South American genus *Pseudodisersus*. However, from *Pseudodisersus* which it resembles in habitus, *Neblinagena* differs as follows: with only a short, shallow remnant of the deep and complete transverse groove across the pronotum near the apex; without the bidentate posterolateral angles of the pronotum found on *Pseudodisersus*; without mammilliform tubercles on the base of the pronotum in front of the scutellum; and the prosternum in front of the procoxae is 4 times the length of the third antennal segment instead of one-half the length of the third antennal segment as it is in *Pseudodisersus*.



Figs. 1–6. *Neblinagena prima*. 1, Habitus, dorsal view, 9×. 2, Habitus, ventral view, 9×. 3, Head, face view, 60×. 4, Head, adoral view, 60×. 5, Eye and antenna, 70×. 6, Labial palpus, apical segment with sensilla, 500×.

The genus *Neblinagena* may be distinguished from *Phanocerus* by replacing 4a in Brown's (1981) key with the following couplet.

Length, 6.0 mm. Clypeus fused to frons and slightly raised where fused. First visible abdominal sternum with distinct carinae extending from meta-

coxae to posterior margin of sternum. Elytral apices prolonged and terminating in narrowed but rounded apices ..... *Neblinagena*, new genus
Length, 2.5–4.0 mm. Clypeus separated from frons by a distinct groove. First abdominal sternum without carinae. Elytral apices rounded, not prolonged ..... *Phanocerus* Sharp

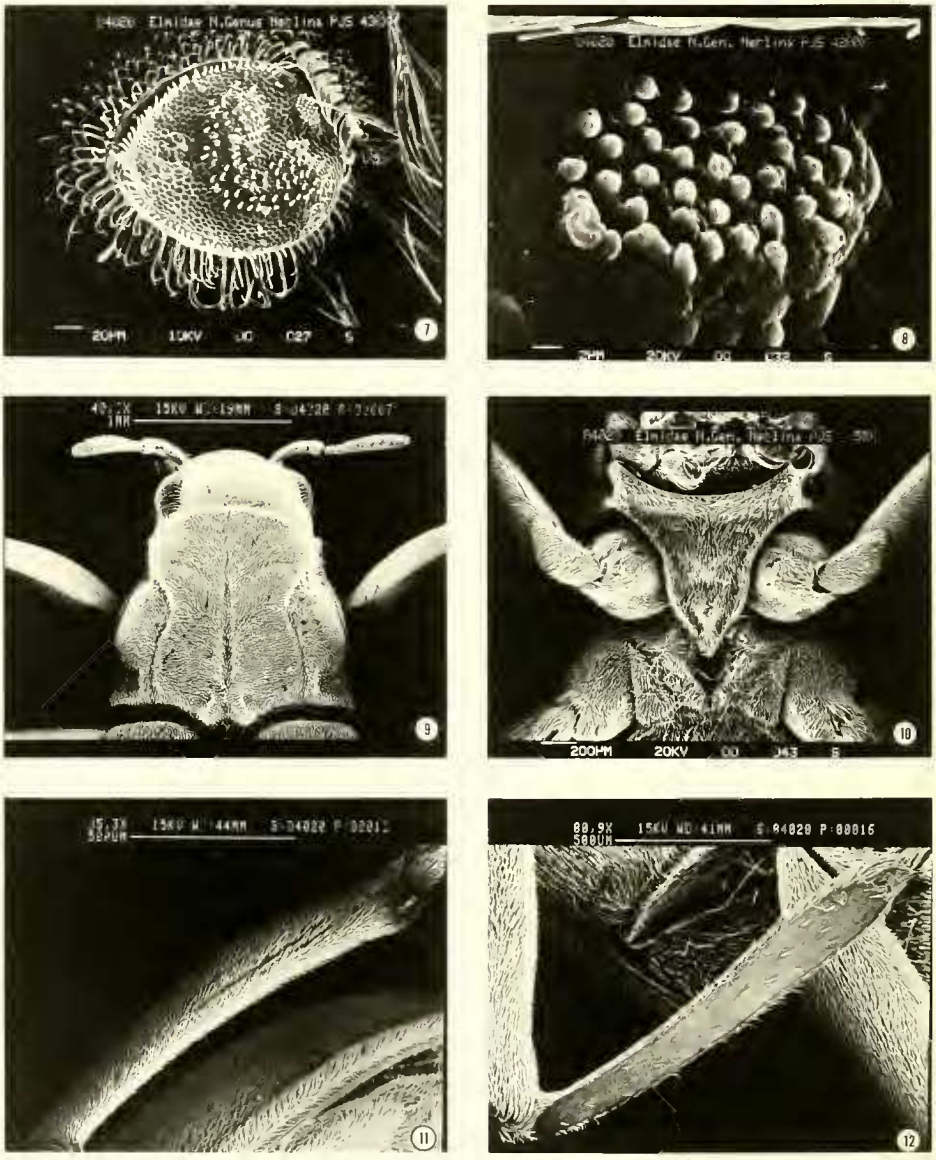
Neblinagena prima, New Species
Figs. 1–15

Holotype male.—Body form and size: Elongate, subparallel, moderately convex dorsally (Figs. 1, 2). Length, 6.0 mm; width, 2.1 mm.

Coloration: Black dorsally. Antennal segments 1 and 2 reddish brown; antennal segments 3–11 black. Venter black except maxillary palpal segments 1, 2, and 3, labial palpi, labium, maxillae, coxae, trochanters, medial (posterior) surfaces of femora, tarsal claws, and narrow posterior margins of metasternum between metacoxae reddish brown.

Head: Finely, densely punctate; punctures separated by about half their diameter. Eyes large, hemispherical (Figs. 3, 4, 5). Antenna (Fig. 5) with basal two segments moderately densely pubescent on anterior and posterior margins. Clypeus shallowly arcuately emarginate anteriorly. Labrum rectangular; surface, especially on anterior half, finely densely punctate; anterior margin feebly, shallowly emarginate apicomedially and densely fringed with long, fine, golden, hairlike setae; anterolateral angles rounded but not expanded laterally; lateral margins not expanded but a long, dense, tuft of black setae curled over margin. Labium with long, dense setae on surface (Fig. 4). Last segment of labial palpus (Fig. 6) and maxillary palpus broad and bearing sensilla on flattened apex (Figs. 7, 8).

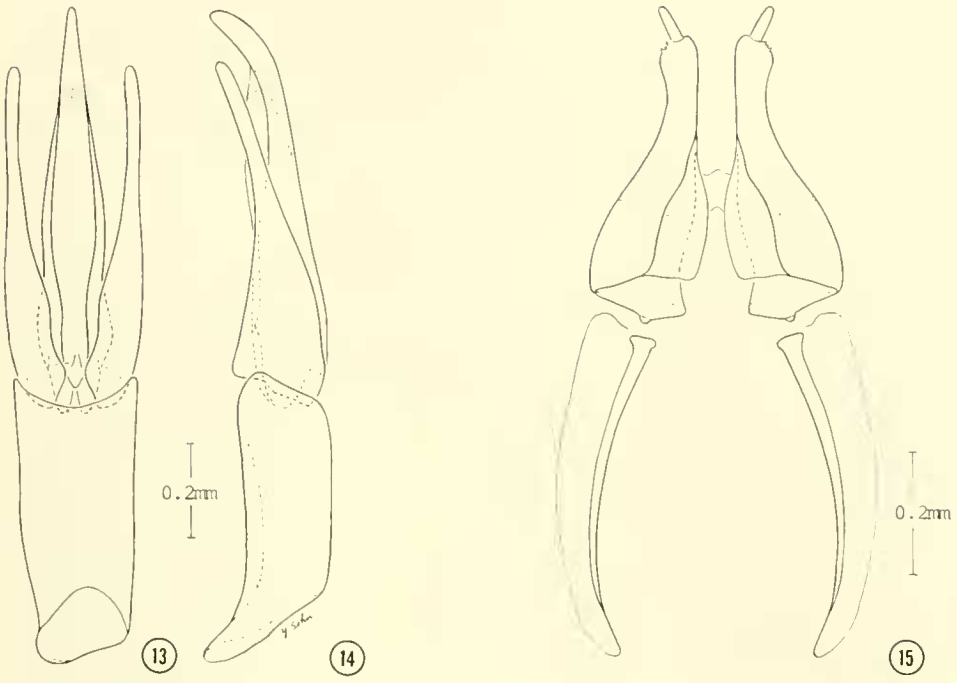
Thorax: Pronotum 1.6 mm long, 1.90 mm wide; widest at base; sides sinuate; anterolateral angles obtuse, with distinct constriction behind each angle resulting from deep arcuate-sinuate sublateral groove which extends from apical third of pronotum to base; apex arcuate; base strongly trisinuate; with a shallow depression on each side of short prescutellar carinae; posterolateral angles obtuse, with a deep, broad depression adjacent to each angle (Fig. 9); discal surface with Y-shaped groove; lateral branches of groove shallowly, broadly depressed and not confluent with arcuate-sinuate sublateral groove; stem of Y-shaped groove moderately deep and terminating at anterior end of prescutellar carinae; sublateral carina short but evident at base then merging with sublateral arcuate-sinuate groove; discal area finely densely punctate, punctures separated by a distance equal to or less than their diameter. Prosternum long in front of procoxae. Prosternal process (Fig. 10) triangular, broad at base and tapering to apex; lateral margins reflexed; middle moderately longitudinally cariniform; apex subacute. Mesosternum with a deep depression for reception of apex of prosternal process. Metasternum with disc depressed on posterior three-fourths with a deep, narrow, shining, longitudinal groove on posterior two-thirds of midline; surface finely microreticulate and punctate; punctures on lateral surface coarse and sparse, separated by a distance about 2 times their diameter. Procoxae and metacoxae moderately widely separated, mesocoxae slightly more widely separated. Legs long and slender. Protibiae and metatibiae (Fig. 11) with hydrofuge pubescence laterally. Mesotibiae with lateral surface finely alutaceous; without dense hydrofuge pubescence except a very short area on apex (Fig. 12). Tarsal claws long and stout. Elytron with 10 rows of coarse



Figs. 7–12. *Neblinagena prima*. 7, Maxillary palpus, last segment, apex with sensilla, 430×. 8, Sensilla, last segment, maxillary palpus, 4200×. 9, Head and pronotum, 41×. 10, Prosternum, 50×. 11, Metatibia, lateral view, 85×. 12, Mesotibia, lateral view, 81×.

punctures; discal punctures separated by a distance equal to their diameter or slightly less; intervals finely densely punctate, punctures separated by about their width and obscured by dense pubescence; humeral area strongly tumid; sides of elytra distinctly margined and almost parallel; apex not dehiscent but prolonged and terminating in rounded apex.

Abdomen: First sternum with intercoxal process broadly, shallowly depressed and carinate adjacent to metacoxae; carinae extending longitudinally behind meta-



Figs. 13–15. *Neblinagena prima*. 13, Male genitalia, dorsal view. 14, Male genitalia, lateral view. 15, Female genitalia, ventral view.

coxae for entire length of sternum. Last sternum with a small tuft of longer, golden, hairlike setae on an acute apex.

Male genitalia.—As illustrated (Figs. 13, 14).

Female.—Similar to male. Genitalia as illustrated (Fig. 15).

Variations.—The few specimens available are very similar. The only minor variations noted are the length, which ranges from 6.0 to 6.3 mm, and the reddish-brown instead of black mesosternum and inner surface of the protibiae, mesotibiae, and metatibiae of some specimens.

Type-data.—Holotype male: VENEZUELA: TERRITORIO FEDERAL AMAZONAS: Cerro de la Neblina, Camp XI (1 km W), 00°52′N 65°58′W, 1450 m (at stream), 25–28 February 1985, P. and P. Spangler, R. Faitoute; USNM type number 100124; deposited in the National Museum of Natural History, Smithsonian Institution. Allotype and 6 paratypes (2 males, 4 females): Same locality data as holotype. Additional paratypes with the same data except as follows. Camp VII, 00°51′N 65°58′W, 1730 m, 1 February 1985, P. and P. Spangler, R. Faitoute, 1 male; Camp II, 00°50′N 65°58′W, 2100 m, 13 February 1985, W. Steiner, 1 female; Camp X, 00°54′N 66°2′W, 1690 m, 12–13 February 1985, W. Steiner, 23 males, 10 females; Camp IV, 00°56′N 65°57′W, 770 m, 15–18 March 1984, O. S. Flint, Jr., 2 males, 5 females, at blacklight.

Paratypes will be deposited in the collections of the Instituto de Zoologia Agricola, Facultad de Agronomia, Maracay, Venezuela; American Museum of Natural History, New York; California Academy of Sciences, San Francisco; Canadian

National Collection, Ottawa; Institut Royal de Histoire Naturelle de Belgique, Bruxelles; Museum National de Histoire Naturelle, Paris; Museo Argentina de Ciencias Naturales, Buenos Aires; Zoologische Sammlung Bayerischen Staates, Munchen; and the collection of Harley P. Brown, Norman, Oklahoma.

Etymology.—The specific epithet, *prima* is from the Latin *primus* meaning first, because this is the first aquatic beetle species to be described from the survey of the flora and fauna of the Cerro de la Neblina.

Habitat.—The type-material was collected from 5 camps on Cerro de la Neblina at altitudes ranging from 770 to 2100 meters. Specimens from Camp IV were collected at blacklight operated beside the Rio Baria. All other adult specimens and numerous larvae were collected by hand from small, partially shaded tributaries feeding the Rio Baria. The small blackwater tributary streams varied from about 1 to 5 meters in width with cascades, riffles, and occasional pools usually less than 1 meter deep. The substratum was bedrock, boulders, cobbles, and occasional small sandy deposits. Flooding occurs frequently in these small streams and leaf packs, where most of our specimens were found, were moderately abundant. The Rio Baria, also a blackwater stream, clear of suspended material is about 15 to 25 meters wide and 1 or more meters deep. The river flows through a series of riffles and pools and has a substratum of sand, boulders, and bedrock, and is a tumbling river given to flash-flooding.

Colorimetric water chemistry analyses at Camp XI provided the following data; pH–4, hardness–O, oxygen–9 ppm. The water temperature was 17°C.

Acknowledgments

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Literature Cited

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